

# New Jersey Semi-Conductor Products, Inc.

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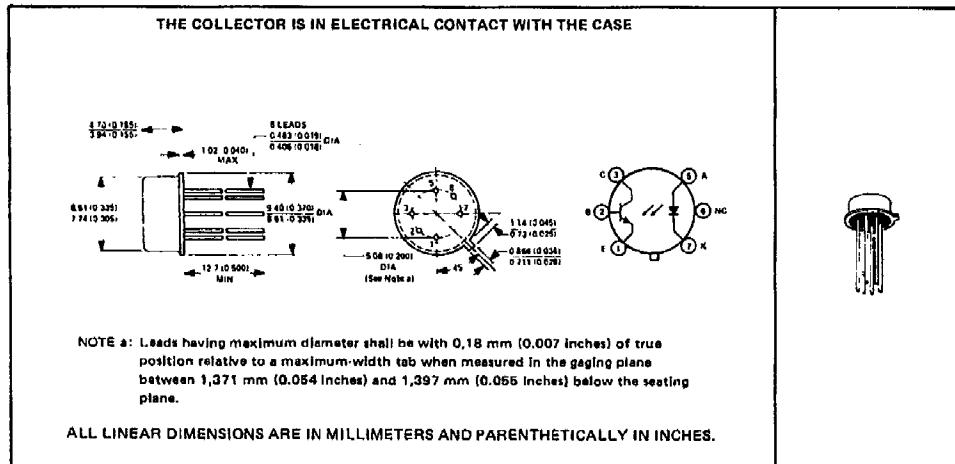
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## TIL102, TIL103 OPTOCOUPLED

### GALLIUM ARSENIDE DIODE INFRARED SOURCE OPTICALLY COUPLED TO A HIGH-GAIN N-P-N SILICON PHOTOTRANSISTOR

- Photon Coupling for Isolator Applications
- Base Lead Provided for Conventional Transistor Biasing
- High Overall Current Gain . . . 1.5 Typ (TIL103)
- High-Voltage Transistor . . . V(BR)CEO = 35 V Min
- High-Voltage Electrical Isolation . . . 1-kV Rating
- Stable over Wide Temperature Range

#### mechanical data



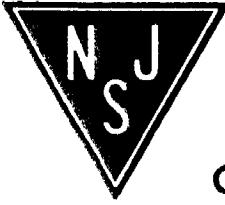
#### absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Input-to-Output Voltage . . . . .	±1 kV
Collector-Emitter Voltage . . . . .	35 V
Collector-Base Voltage . . . . .	35 V
Emitter-Base Voltage . . . . .	4 V
Input Diode Reverse Voltage . . . . .	2 V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (See Note 1) . . . . .	40 mA
Continuous Collector Current . . . . .	50 mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (See Note 2) . . . . .	300 mW
Storage Temperature Range . . . . .	-55°C to 125°C
Lead Temperature 1.6 mm (1/16 inch) from Case for 10 Seconds . . . . .	240°C

NOTES: 1. Derate linearly to 125°C free air temperature at the rate of 0.67 mA/°C.  
2. Derate linearly to 125°C free air temperature at the rate of 3 mW/°C.

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Quality Semi-Conductors



## TIL102, TIL103 OPTOCOUPLES

electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS	TIL102			TIL103			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100 \mu A, I_E = 0, I_F = 0$	35		35	35		35	V
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 1 mA, I_B = 0, I_F = 0$	35		35	35		35	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100 \mu A, I_C = 0, I_F = 0$	4		4	4		4	V
$I_R$	Input Diode Static Reverse Current	$V_R = 2 V$		100		100		100	$\mu A$
$I_{C(on)}$	On-State Collector Current	Phototransistor Operation	$V_{CE} = 5 V, I_B = 0, I_F = 10 mA$	2.5	6	10	15		mA
		Photodiode Operation	$V_{CB} = 5 V, I_E = 0, I_F = 10 mA$		40		40		$\mu A$
$I_{C(off)}$	Off-State Collector Current	Phototransistor Operation	$V_{CE} = 20 V, I_B = 0, I_F = 0$		6	100	6	100	nA
		Phototransistor Operation $T_A = 100^\circ C$	$V_{CE} = 20 V, I_B = 0, I_F = 0$		4		4		$\mu A$
		Photodiode Operation	$V_{CB} = 20 V, I_E = 0, I_F = 0$		0.1		0.1		nA
$hFE$	Transistor Static Forward Current Transfer Ratio	$V_{CE} = 5 V, I_C = 10 mA, I_F = 0$		300		500			
$V_F$	Input Diode Static Forward Voltage	$I_F = 10 mA$			1.3		1.3		V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 2.5 mA, I_B = 0, I_F = 20 mA$			0.3				V
		$I_C = 10 mA, I_B = 0, I_F = 20 mA$					0.3		
$r_{IO}$	Input-to-Output Internal Resistance	$V_{in-out} = \pm 1 kV, \text{ See Note 3}$		$10^{11}$	$10^{12}$	$10^{11}$	$10^{12}$		$\Omega$
$C_{IO}$	Input-to-Output Capacitance	$V_{in-out} = 0, f = 1 MHz, \text{ See Note 3}$		2.5		2.5			$pF$

NOTE 3: These parameters are measured between both input diode leads shorted together and all the phototransistor leads shorted together.

switching characteristics at 25°C free-air temperature

PARAMETER		TEST CONDITIONS	TIL102		TIL103		UNIT
			TYP	TYP	TYP	TYP	
$t_r$ Rise Time	Phototransistor Operation	$V_{CC} = 20 V, I_B = 0, I_{C(on)} = 5 mA, R_L = 100 \Omega, \text{ See Test Circuit A of Figure 1}$	3		6		
$t_f$ Fall Time	Phototransistor Operation		3		6		$\mu s$
$t_r$ Rise Time	Photodiode	$V_{CC} = 20 V, I_E = 0, I_{C(on)} = 60 \mu A, R_L = 100 \Omega, \text{ See Test Circuit B of Figure 1}$	150		160		
$t_f$ Fall Time	Photodiode Operation		150		150		ns